

Cancer mortality in Europe in 2015, and an overview of trends since 1990

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Short title: Cancer mortality in Europe

Key message: Mortality rates from most neoplasms continued to decline in Europe over the 2000s by over 1% per year in men and about 0.8% in women, with the only exception of pancreatic, skin and kidney cancers, and lung cancer in women. However, there were substantial differences across Europe, with generally less favourable trends in most eastern European countries.

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Abstract

Background

Cancer mortality in Europe has been decreasing since the late 1980s or 1990s though with different patterns in many areas. In this work, we updated trends in cancer mortality in Europe.

Methods

We extracted data from the World Health Organization mortality database for 24 cancer sites, 36 European countries and the European Union (EU) as a whole over the 1990-2017 period. We computed age-standardized death rates per 100,000 population and we performed a joinpoint regression analysis for all cancers, selected major neoplasms and countries. The estimated annual percent change (APC) for each identified linear segment, and the weighted average APC (AAPC) over the entire study period were provided as summary measures of the changes in rates over the time period.

Results

In 2015, the age-standardized mortality rates from all cancers in the EU were 137.5 deaths per 100,000 in men and 85.7 in women. Eastern European countries showed the highest rates with values over 150 deaths per 100,000 in men and over 100 deaths per 100,000 in women. Mortality from all cancers in the EU declined annually by 1.5% in men since 2006 and by 0.8% in women since 2007. Most cancer sites showed decreasing trends with steady declines over the whole period for cancers of stomach, intestines, lung in men, breast and prostate. Unfavourable mortality trends persisted for cancers of liver, lung in women, pancreas, besides skin and kidney.

Conclusions

The downward trends in total cancer mortality in Europe still continue over the last decade. However, the trends were less favourable in most eastern European countries. Tobacco control in men (but not in women), improvements in diagnosis and therapy were the underlying factors of these trends.

Keywords: cancer, mortality, Europe, trends

Introduction

Cancer mortality shows substantial variation across Europe. Steady declines were observed since the 1980s in most western European countries, and a decade later in central and eastern Europe [1]. Such favourable trends have been attributed to the reduced prevalence of smoking in men [2, 3] and decreased alcohol consumption in Mediterranean countries [4], but also to the increased availability of screening, early diagnosis, and treatment. However, suboptimal tobacco control, inadequate adoption of modern diagnostic techniques and effective treatment have produced remarkable disparities in cancer mortality across Europe [5] with systematically less favourable mortality trends in eastern European countries [1, 6].

In this work, we provide updated data on cancer mortality in Europe.

Materials and Methods

We extracted official death certification data from the World Health Organization (WHO) database for 24 cancer sites plus all neoplasms in 36 European countries plus the European Union 28 Member States (EU-28) as a whole, for the 1990-2017 period [7]. All countries considered had death certification coverage over 95%, except Serbia (84%). During the considered calendar years, we used three different Revisions of International Classification of Diseases (ICD) and coded cancer deaths for all calendar years and countries, according to the 10th Revision of the ICD [8].

We obtained estimates of the resident population, based on official censuses, from the same WHO database [7]. Since population estimates for France and Ireland in 2015, Spain in 2016, and Switzerland in 2014 and 2015 were not available in the WHO database, these were obtained from the EUROSTAT database [9].

No interpolations were made for missing data in a few countries and calendar years, except for the calculation of the rates for the EU-28 as a whole.

Using the dataset with deaths counts and resident populations, we calculated age-specific rates for 18 age groups (from 0-4 to 80-84, and ≥ 85 years), sex and calendar year. We then computed age-standardized mortality rates per 100,000 person-years (at all ages and the 35-64 age-group), based on the world standard population [10].

For the EU-28 as a whole and a subset of 24 selected major countries (i.e. with populations over 5 million inhabitants), we performed a joinpoint regression analysis on mortality data for all neoplasms, and selected

major cancers (i.e. intestines, lung, breast and prostate), over the 1990-2017 period [11]. We thus identified the time point(s), called “joinpoints”, when a change in the linear slope (on a log scale) of the temporal trend occurred [12], by testing from a zero up to a maximum of four joinpoints. The estimated annual percent change (APC) for each identified linear segment, and the weighted average APC (AAPC) over the entire study period (1990–2017) as a summary measure, were computed for each joinpoint model [12, 13].

Results

Table 1 and Table 2 give the overall age-standardized mortality rates per 100,000 men and women, respectively, and number of deaths from selected cancers observed in 2015 in 36 European countries and the EU-28 as a whole. Figures S1-S8 show rates (from largest to smallest) for the EU-28 by cancer site (Figure S1), and for all neoplasms (S2) and selected major cancers (S3-S8) by country (Online-only Supplementary Material).

In men, all neoplasms mortality rate in the EU-28 was 137.5/100,000 corresponding to 760,123 deaths in 2015. Most eastern European countries and Russia showed the highest mortality rates, while northern European countries had the lowest ones. With regard to major cancers, in the EU-28, male mortality rates were 34.8/100,000 for lung cancer, 16.1 for intestinal cancer, 10.7 for prostate cancer, 7.9 for pancreatic cancer, and 6.3 for stomach cancer. Mortality rates from male lung cancer ranged between 15-23/100,000 in Scandinavian countries, 27-36 in the UK, France, Germany, Italy and Spain, to 45-63 in eastern European countries and Russia. Mortality rates from intestinal cancer ranged from about 13-15/100,000 in major western countries, to around 30/100,000 in Hungary, Slovakia and Croatia. The Russian rate was 18.7/100,000. Mortality from prostate cancer showed the highest rates in Baltic and Scandinavian countries, while the lowest ones were in Italy and other southern European countries. Mortality from pancreatic cancer ranged between 6.5 and 8.5/100,000 in the UK, Spain, Italy, France, and Germany, to around 10-11/100,000 in several central and eastern European countries. Stomach cancer mortality rates ranged from 3-4 deaths/100,000 in northern and central European countries, to 19.4/100,000 in Russia, followed by other eastern European countries. Portugal, Italy, and Spain had relatively high rates, too.

In women, total cancer mortality rate in the EU-28 was 85.7/100,000, corresponding to 603,984 deaths in 2015. The highest mortality rate was observed in Hungary, followed by other eastern and northern countries.

In contrast, the lowest mortality rates were observed in southern and eastern countries, with the lowest one in Spain. With regard to major cancers, EU-28 female mortality rates were 14.5/100,000 for breast cancer, 14.3 for lung cancer, 9.4 for intestinal cancer, 5.5 for pancreatic cancer, and 2.9 for stomach cancer. The highest breast cancer rates were in Serbia and other central European countries (around 14-15), and Russia (15.7), while the lowest ones were in Norway, other Scandinavian countries, and Spain (about 10-11/100,000). The highest lung cancer rates were in Hungary, followed by some northern countries, while the lowest ones were in eastern Europe. Mortality rates from intestinal cancer ranged between 7-8 deaths/100,000 in Austria, Greece, Switzerland, and France, to 15.1/100,000 in Hungary. Mortality from pancreatic cancer ranged from 3.6/100,000 in Ukraine, around 4 in Portugal and Spain, to 7.3 deaths/100,000 in Hungary. Mortality from stomach cancer ranged from 1.5/100,000 in France, followed by most western and northern European countries (rates around 2), to 7.9/100,000 in Russia.

Corresponding figures for the 35-64 age group are displayed in the Tables S1 and S2 (Online-only Supplementary Material).

Figure 1 and Table S3 show the joinpoint regression analysis of mortality trends for 23 cancer sites plus all neoplasms in the EU-28 from 1990 to 2015 at all ages and for the 35-64 age group, in men and women. The downward trends in total cancer mortality started in the early 1990s and the mortality rate at all ages declined annually by 1.5% in men since 2006 and by 0.8% in women since 2007. Downward trends were observed for most cancer sites, with steady declines for cancers of stomach, intestines, lung in men, breast and prostate. In contrast, unfavourable trends were observed for lung cancer in women and increasing or stable rates were observed for pancreatic cancer. Favourable trends were also observed for most other cancer sites, except liver over the recent calendar years, skin and kidney in men.

Figures 2a-2e (and Tables S4a-S4e) give the results from the joinpoint analysis of mortality trends (1990-2017) for all neoplasms and major cancer sites in 24 selected countries. Mortality from all neoplasms declined in most countries for both sexes, with the exceptions of Bulgaria, Greece and Romania. The favourable trends started after the mid-1990s in most eastern countries, Norway and Spain. Upward trends were observed in mortality rates from intestinal cancer in East Europe. Lung cancer mortality decreased in most countries in men, except in Bulgaria, Portugal and Romania. Lung cancer mortality in women increased in most countries, while breast cancer decreased by 2-4% per year over the most recent period in most

northern European countries, and around 1.5% in most western and southern countries. In Russia, breast cancer mortality started to decline over the last few years. Greater declines in breast cancer were observed among middle-aged women. After the increasing trends observed over the 1990s, mortality from prostate cancer declined in most countries with a few exceptions in East Europe.

Discussion

Mortality rates from major cancer sites continued to decline in the EU-28 over the 2000s, with the only exception of pancreatic, skin and kidney (only in men) cancers and of some increase in mortality from liver cancer in both sexes and lung cancer in women. However, there are substantial differences among EU countries, with less favourable trends taking place in some eastern European countries.

The downward trends in overall cancer mortality is mainly driven by the declines in mortality from most tobacco-related cancers in men consequent to the reduction in male smoking prevalence across Europe [2, 3].

The opposite trend in female lung cancer mortality reflects the different stage in the smoking epidemic between sexes, and the lagged decline in smoking prevalence in women compared to men [2, 14, 15].

The potential impact of tobacco reduction in men on mortality from pancreatic cancer was partly counterbalanced by the rising prevalence of obesity and diabetes over the last three decades [16]. Moreover, improved diagnosis and certifications may have played some role on the unfavorable mortality trend from pancreatic cancer.

Apart from the smoking prevalence reduction in men, the steady decline in stomach cancer mortality could also be attributed to improved water sanitation, lifestyle and environmental conditions that resulted in reduced prevalence of *Helicobacter pylori* infection [17]. The reduced consumption of food preserved by salting, pickling and smoking may have also contributed to the downward trend [18].

Improved working conditions and less exposure to occupational carcinogens [19, 20] have also contributed to the downward trends in mortality from lung and bladder cancer.

Reductions in alcohol consumption, especially in southern Europe, partly explains the decline in cancer of oral cavity, pharynx and esophagus [4]. On the other hand, increased harmful alcohol consumption in

northern Europe and increased prevalence of HCV in northern and eastern Europe [4] have driven the increment in primary liver cancer mortality all over Europe [21, 22].

Screening and early diagnosis have contributed to the reduction in mortality from colorectal cancer [23, 24]. However, the screening uptake differs among countries due to resource availability that may explain some of the between-country variability in mortality patterns and trends [25, 26].

Mammography screening programs, early diagnosis and mostly availability of effective therapy, including progress in radiotherapy and surgery are the key factors for the substantial downward trends in breast cancer mortality in Europe [27, 28], as in other (high-income) areas of the world [29]. Some eastern countries, including Romania, Russia and Ukraine showed less favorable trends. Breast cancer rates in those areas of the continent were particularly low in the past [30], and this may reflect some levelling of rates across Europe. In addition, delays in the adoption of effective screening programs and treatments are possible in those countries [6].

Wider adoption of radical prostatectomy in combination with adjuvant hormonal therapy for localized cancers may partly explain the downward trend in prostate cancer mortality observed since the late 1990s in Europe, though the role of PSA testing is likely, but still unquantified [31].

The decline in mortality from cancer of the testis observed since 1970s continued over the 1990s, but levelled off during the 2000s. This pattern has been mainly attributed to the adoption of effective treatments, mainly platinum-derived chemotherapy and its analogues [32].

Subsequent advancements in therapies were the key underlying factors of the downward trend in mortality from leukaemias, targeted therapy has improved the prognosis of patients with chronic myelogenous leukemia and allogeneic hematopoietic cell transplantation improved survival in all malignant hematologic diseases [33-36].

The less favorable trend in mortality from skin cancer may reflect the increased recreational exposure to sunlight ultraviolet radiation and use of tanning beds [37], while the growing obesity [16] and hypertension rates are possible explanation of the increased mortality due to kidney cancer [38].

Despite possible problems in data quality, death certification is reasonably valid in all the European countries considered, and allows therefore to obtain a meaningful time trends analysis for most countries considered [39, 40].

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Figures' Legend

Figure 1. Joinpoint analysis of trends in age-standardized (world population) mortality rates from 23 cancer sites and all neoplasms (malignant and benign) in the European Union, from 1990 to 2015. Filled boxes represent men, all ages; empty boxes men, 35-64 age group; filled circles women, all ages; empty circles women, 35-64 age group.

Figure 2. Joinpoint analysis of trends in age-standardized (world population) mortality rates from all neoplasms (a), cancers of intestines (b), lung (c), breast (d) and prostate (e), in 24 selected European countries, from 1990 to 2017 (according to data availability). Filled boxes represent men, all ages; empty boxes men, 35-64 age group; filled circles women, all ages; empty circles women, 35-64 age group.

Table 1. Overall age-standardized (world population) mortality rates (first row) and average annual number of deaths (second row) from selected cancers per 100,000 men in 36 European countries plus the European Union as a whole (EU-28) in 2015^a.

Table with 23 columns (ICD-10, Oral cavity/Pharynx, Esophagus, Stomach, Intestines, Liver, Gallbladder, Pancreas, Larynx, Lung, Bone, Connective/soft tissue sarcomas, Skin, Prostate, Testis, Bladder, Kidney, Thyroid, HL, NHL, MM, Leukemias, All neoplasms) and 36 rows of data for various countries including Austria, Belarus, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Macedonia, Malta, Netherlands, and Norway.

	Oral cavity/ Pharynx	Esophagus	Stomach	Intestines	Liver	Gallbladder	Pancreas	Larynx	Lung	Bone	Connective/ soft tissue sarcomas	Skin	Prostate	Testis	Bladder	Kidney	Thyroid	HL	NHL	MM	Leukemias	All other neoplasms
Poland	112	160	204	864	128	24	376	34	1191	11	23	224	1045	5	215	167	19	8	187	143	186	5962
	6.95	3.74	10.53	21.41	1.36	1.93	7.82	4.48	50.21	0.74	0.94	4.31	13.38	0.54	8.62	5.67	0.27	0.39	3.08	2.06	5.02	178.87
Portugal	2117	1167	3419	7223	436	639	2469	1405	16261	195	237	1461	4876	129	2990	1847	91	105	956	689	1528	58310
	7.07	4.62	12.48	20.31	6.61	1.42	6.91	2.85	28.97	0.60	0.71	2.13	10.92	0.23	5.41	2.69	0.35	0.37	3.99	2.26	4.38	143.69
Rep. of Moldova	620	437	1403	2529	695	169	753	285	3041	45	65	241	1723	15	743	303	40	31	455	291	470	16299
	11.74	2.90	13.81	22.21	1.34	0.70	8.79	6.39	35.48	1.22	1.04	2.81	9.56	0.48	5.80	3.98	0.43	0.77	3.12	0.56	4.05	166.01
Romania	263	65	302	483	29	16	195	146	776	23	16	60	213	10	127	82	9	16	60	12	81	3569
	12.17	3.53	12.34	19.49	3.24	1.28	9.03	5.93	47.80	1.56	0.74	2.65	10.02	0.46	6.12	3.45	0.34	0.43	2.46	1.11	4.74	175.29
Russia	1869	572	2230	3691	543	240	1578	963	8058	235	107	489	2198	61	1211	595	60	63	386	205	763	30433
	8.33	5.69	19.38	18.74	5.48	.	8.81	4.39	44.71	.	.	1.76	11.77	.	5.46	.	.	.	2.40	1.09	4.53	169.78
Serbia	7622	5242	17960	17476	4974	.	8095	4022	41123	.	.	1601	11111	.	5144	.	.	.	2092	968	3633	155002
	6.22	3.17	7.90	21.92	1.90	1.75	8.44	4.89	55.22	0.93	1.19	4.27	12.11	0.93	7.02	4.03	0.49	0.85	2.53	1.57	5.04	177.22
Slovakia	404	212	587	1648	133	130	618	337	3815	62	56	301	1073	40	546	275	33	43	173	115	319	12660
	13.75	6.11	8.94	28.39	3.70	2.84	10.33	3.87	38.71	0.71	1.12	3.96	16.75	0.67	6.54	7.00	0.27	0.59	4.59	2.24	5.18	186.29
Slovenia	554	251	371	1194	153	120	428	156	1607	25	41	161	738	23	283	282	11	23	188	94	202	7671
	6.46	3.47	9.58	21.48	7.24	1.75	8.92	1.95	39.96	0.30	1.39	3.84	15.78	0.45	5.10	6.12	0.34	0.19	4.67	2.20	5.79	161.33
Spain	122	72	211	467	156	40	185	41	836	6	18	83	404	6	129	129	8	4	100	50	114	3475
	4.04	3.65	6.35	17.32	6.50	1.06	6.90	2.58	36.43	0.70	0.78	1.70	8.25	0.14	6.25	4.67	0.26	0.27	2.86	1.66	4.04	132.58
Sweden	1733	1626	3331	9552	3064	606	3311	1228	17259	194	309	931	5757	44	3860	2418	133	122	1467	976	2002	6784
	2.19	3.03	3.10	13.37	2.37	1.72	7.60	0.42	15.48	0.22	1.12	3.35	15.69	0.10	3.55	3.37	0.26	0.15	2.83	2.09	3.49	101.96
Switzerland	221	331	348	1611	253	193	872	48	1813	20	98	363	2357	7	477	387	30	17	341	264	393	1224
	3.69	4.06	3.82	11.40	5.62	0.86	7.03	0.81	23.97	0.33	1.08	3.02	11.97	0.33	3.82	3.22	0.37	0.25	2.78	2.23	3.70	107.68
Ukraine	293	343	332	1072	484	78	605	65	2056	21	73	278	1356	19	403	307	33	22	274	217	345	9843
	10.73	4.74	14.40	17.92	3.21	.	7.88	4.56	34.07	.	.	1.88	10.91	.	5.13	.	.	.	2.46	0.89	4.71	149.07
UK	3111	1390	4389	5653	925	.	2356	1331	10264	.	.	544	3644	.	1644	.	.	.	670	263	1207	44513
	3.26	8.18	3.84	14.92	4.19	0.44	6.48	1.04	26.88	0.47	0.88	2.86	13.25	0.18	4.31	4.05	0.22	0.32	3.76	2.22	3.91	124.32
UK, Engl and Wales	1927	5466	2817	10880	2875	332	4469	698	19200	207	487	1962	11827	71	3681	2796	153	188	2718	1725	2734	89773
	3.13	8.04	3.79	14.66	4.02	0.44	6.48	0.95	25.97	0.47	0.88	2.87	13.17	0.15	4.26	3.97	0.23	0.32	3.71	2.17	3.87	122.07
UK, Northern Ireland	1639	4793	2483	9559	2447	297	3988	574	16574	179	430	1746	10580	55	3265	2443	139	164	2406	1505	2429	78822
	5.31	7.46	4.04	16.03	4.79	0.39	6.43	1.45	30.64	0.64	0.98	3.31	12.08	0.48	4.22	4.78	0.09	0.32	4.32	2.66	5.52	134.79
UK, Scotland	84	121	72	287	87	6	116	24	551	8	15	60	262	5	87	89	3	6	77	52	78	2418
	3.97	9.90	4.35	17.38	5.88	0.47	6.47	1.75	35.37	0.49	0.89	2.67	14.40	0.32	4.88	4.69	0.18	0.33	4.13	2.60	3.79	145.15
EU-28	204	552	262	1034	341	29	365	100	2075	20	42	156	985	11	329	264	11	18	235	168	227	8530
	5.03	4.58	6.28	16.06	4.80	1.24	7.91	2.13	34.83	0.59	0.91	2.54	10.71	0.29	4.99	4.72	0.27	0.32	3.36	1.89	4.39	137.58
	22892	23128	34666	93241	25602	7263	42462	10667	183943	2197	3877	14009	74998	946	31938	26447	1478	1439	18802	11380	23713	760127

^aAvailable year for Russia and Macedonia: 2013; for Belarus, Bulgaria and Slovakia: 2014.

	Oral cavity/ Pharynx	Esophagus	Stomach	Intestines	Liver	Gallbladder	Pancreas	Larynx	Lung	Bone	Connective/soft tissue sarcomas	Skin	Breast	Uterus	Ovary	Bladder	Kidney	Thyroid	HL	NHL	MM	Leukemias	All neoplasms
Poland	54	56	121	839	81	55	385	10	984	8	33	155	585	218	299	82	99	29	6	140	134	127	5098
Portugal	676	316	1860	5812	290	1214	2440	205	7484	125	233	1408	6319	3443	2785	815	1068	201	73	915	681	1264	47281
Rep. of Moldova	0.73	0.43	5.72	9.57	1.40	0.92	3.89	0.15	7.23	0.57	0.53	1.12	12.46	4.28	2.58	1.13	0.70	0.35	0.19	2.34	1.23	2.65	70.77
Romania	107	79	937	1717	229	165	670	18	982	62	64	204	1690	607	351	268	136	68	22	392	236	404	10981
Russia	1.11	0.34	5.20	11.45	0.68	0.71	4.86	0.15	5.83	1.17	0.38	1.54	17.49	9.15	4.50	1.01	1.38	0.56	0.48	2.41	0.50	2.59	86.65
Serbia	33	13	167	373	21	24	155	5	184	22	9	50	524	260	123	36	41	15	13	57	16	60	2375
Slovakia	1.43	0.54	4.37	9.88	1.33	1.12	5.06	0.27	10.35	0.79	0.48	1.87	15.67	11.92	5.11	1.08	1.31	0.36	0.19	1.66	0.83	3.33	93.52
Slovenia	305	128	1125	2613	324	276	1286	58	2303	155	95	445	3433	2274	1071	342	345	100	33	330	191	566	21048
Spain	1.23	0.74	7.90	12.10	2.33	.	4.69	0.17	5.57	.	.	1.32	15.68	9.65	5.50	0.71	.	.	.	1.32	0.82	2.87	89.09
Sweden	1823	1320	13509	21276	3951	.	8022	248	8945	.	.	1855	22890	13170	7713	1417	.	.	.	1903	1237	3499	13677
Switzerland	1.20	0.72	3.51	10.85	0.81	1.83	5.61	0.46	18.24	0.50	0.41	2.03	20.17	9.77	6.07	1.51	2.02	0.38	0.48	1.81	0.98	2.76	108.57
UK	97	59	316	1039	73	182	516	41	1449	33	30	200	1693	741	459	160	173	33	29	157	91	216	9233
UK, Engl and Wales	1.65	0.66	4.61	14.05	1.32	3.49	6.34	0.19	10.10	0.59	0.77	2.39	15.49	8.65	6.15	1.25	2.88	0.45	0.40	3.10	1.67	3.32	100.65
UK, Northern Ireland	89	37	285	917	74	230	394	10	567	25	31	149	898	469	329	91	191	30	16	195	104	198	5982
EU-28	0.84	0.59	3.94	10.50	2.81	1.68	5.78	0.36	14.24	0.37	0.71	2.88	15.54	5.69	6.51	1.19	1.74	0.14	0.27	3.34	1.84	2.32	93.51
EU-28	24	14	128	350	93	51	182	9	356	6	18	76	428	162	156	50	57	9	5	133	60	78	2738
EU-28	0.93	0.50	3.04	8.67	1.82	0.90	4.47	0.19	8.73	0.30	0.60	1.11	10.85	3.83	3.67	1.04	1.25	0.27	0.17	1.69	1.15	2.58	67.57
EU-28	592	305	2175	6692	1348	744	3095	86	4366	136	281	759	6235	2269	1979	939	906	205	99	1233	928	1589	43705
EU-28	0.87	0.81	1.68	9.70	1.20	2.13	6.66	0.04	14.44	0.15	0.76	1.86	11.78	4.28	4.50	1.03	1.79	0.26	0.08	1.82	1.56	2.26	82.32
EU-28	117	113	219	1474	156	300	940	7	1813	14	79	222	1423	522	553	197	262	44	16	307	242	353	11226
EU-28	1.20	1.01	1.67	7.15	1.96	0.76	5.56	0.12	12.39	0.29	0.86	1.73	13.51	2.80	4.43	1.13	1.23	0.26	0.12	1.97	1.49	2.36	72.13
EU-28	121	112	198	883	200	91	668	13	1186	21	76	186	1424	299	460	154	155	35	9	261	194	263	7977
EU-28	0.91	0.37	5.46	9.87	1.32	.	3.60	0.09	4.24	.	.	1.38	15.37	9.50	5.23	0.51	.	.	.	1.29	0.70	2.91	77.36
EU-28	428	173	2707	5268	655	.	1920	41	2109	.	.	570	6832	3937	2170	291	.	.	.	548	316	1025	35012
EU-28	1.21	2.66	1.72	9.98	2.16	0.64	5.11	0.23	19.86	0.29	0.70	1.58	15.15	4.22	5.25	1.59	1.96	0.28	0.22	2.43	1.35	2.27	93.81
EU-28	913	2494	1581	9375	1930	588	4472	175	16357	138	411	1264	11470	3102	4067	1708	1677	254	152	2243	1360	1940	78972
EU-28	1.16	2.59	1.62	9.86	2.09	0.62	5.13	0.22	19.05	0.30	0.72	1.59	15.12	4.10	5.23	1.54	1.90	0.29	0.21	2.39	1.34	2.27	92.31
EU-28	779	2172	1341	8224	1662	513	3976	144	13946	126	369	1130	10190	2682	3587	1482	1453	230	129	1974	1206	1714	69050
EU-28	1.50	2.50	2.87	10.48	2.49	0.50	4.92	0.20	21.79	.	0.49	1.60	15.59	4.01	5.62	1.09	1.94	0.23	0.24	2.61	1.30	2.63	96.82
EU-28	27	58	60	246	57	15	112	4	439	.	9	34	291	74	117	33	45	5	5	63	41	61	2062
EU-28	1.59	3.33	2.35	11.06	2.73	0.87	4.93	0.40	27.44	0.23	0.64	1.46	15.36	5.51	5.28	2.21	2.60	0.24	0.28	2.72	1.39	2.14	108.12
EU-28	107	264	180	905	211	60	384	27	1972	12	33	100	989	346	363	193	179	19	18	206	113	165	7860
EU-28	1.23	1.02	2.91	9.40	1.65	1.24	5.53	0.24	14.28	0.34	0.66	1.47	14.54	4.84	4.78	1.17	1.79	0.29	0.19	2.01	1.24	2.63	85.68
EU-28	7785	7474	22162	77122	12329	10023	42201	1402	88502	1580	3430	10764	93903	29691	30213	10900	14039	2370	1075	15945	10294	19137	60398

^aAvailable year for Russia and Macedonia: 2013; for Belarus, Bulgaria and Slovakia: 2014.

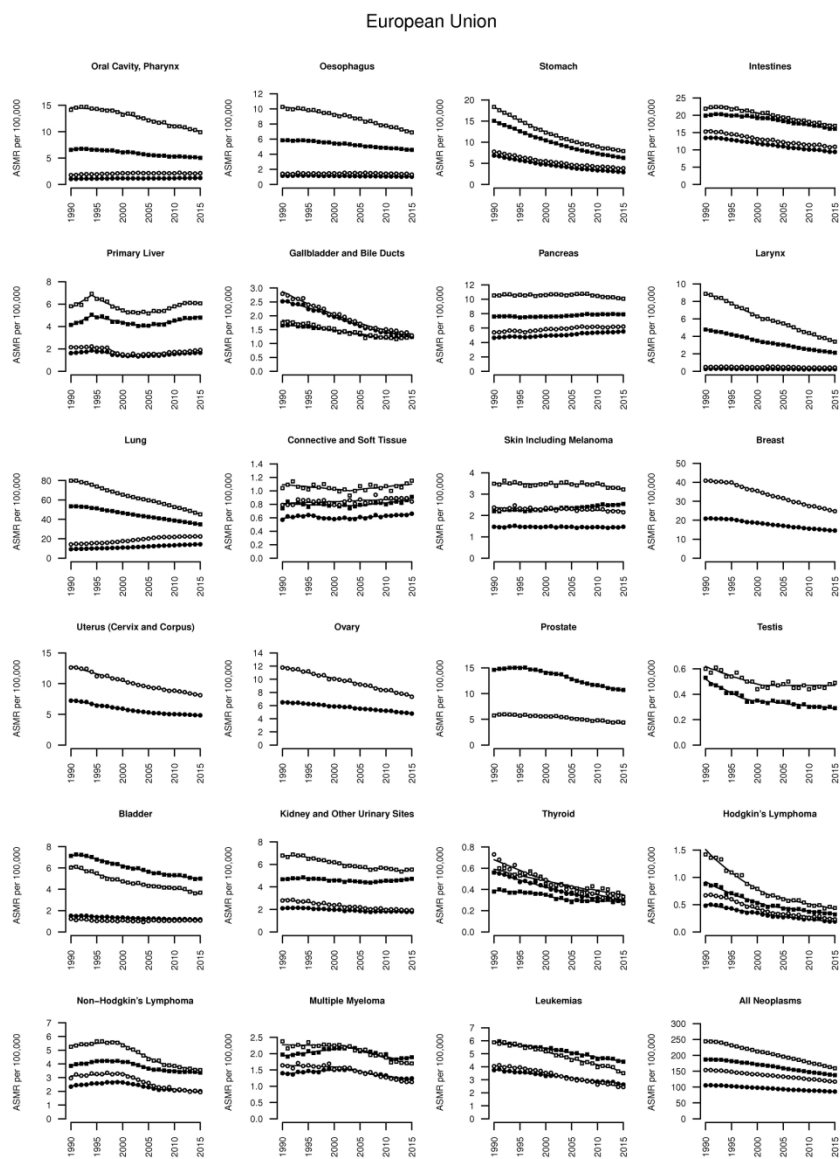


Figure 1. Joinpoint analysis of trends in age-standardized (world population) mortality rates from 23 cancer sites and all neoplasms (malignant and benign) in the European Union, from 1990 to 2015. Filled boxes represent men, all ages; empty boxes men, 35-64 age group; filled circles women, all ages; empty circles women, 35-64 age group.

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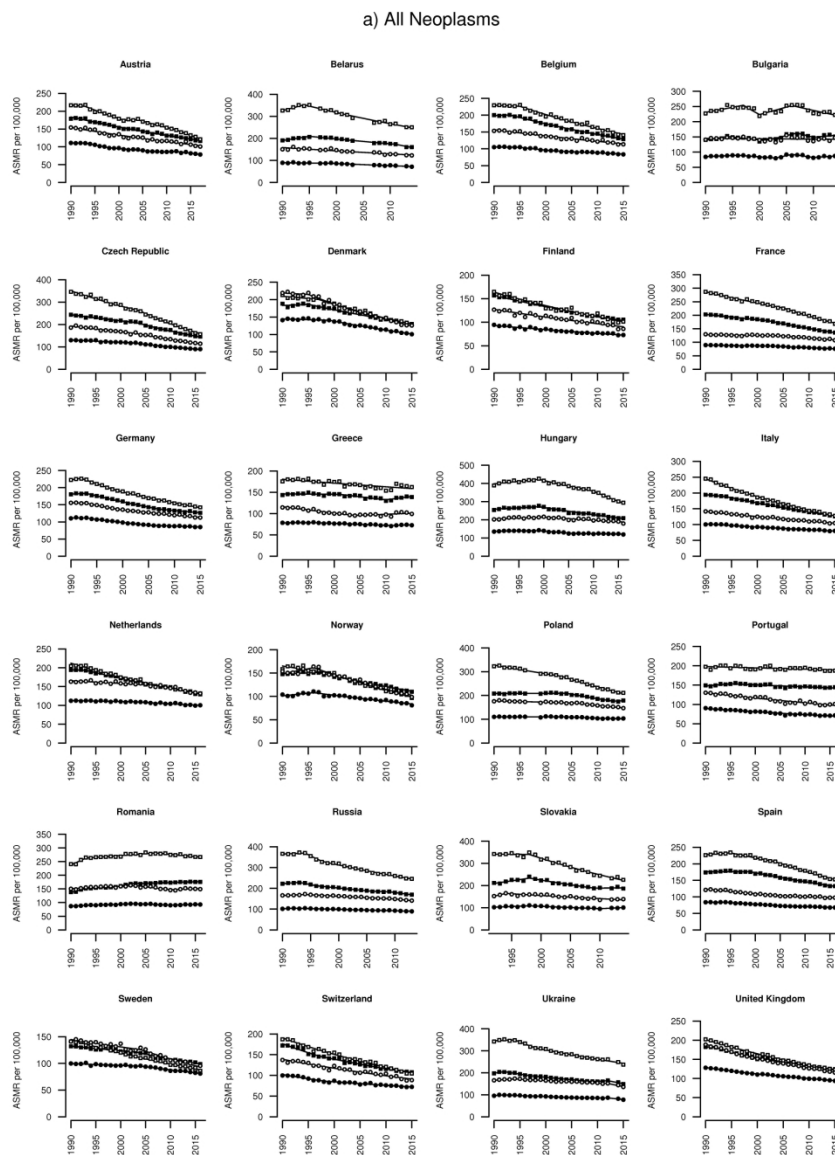


Figure 2. Joinpoint analysis of trends in age-standardized (world population) mortality rates from all neoplasms (a), cancers of intestines (b), lung (c), breast (d) and prostate (e), in 24 selected European countries, from 1990 to 2017 (according to data availability). Filled boxes represent men, all ages; empty boxes men, 35-64 age group; filled circles women, all ages; empty circles women, 35-64 age group.

215x279mm (300 x 300 DPI)

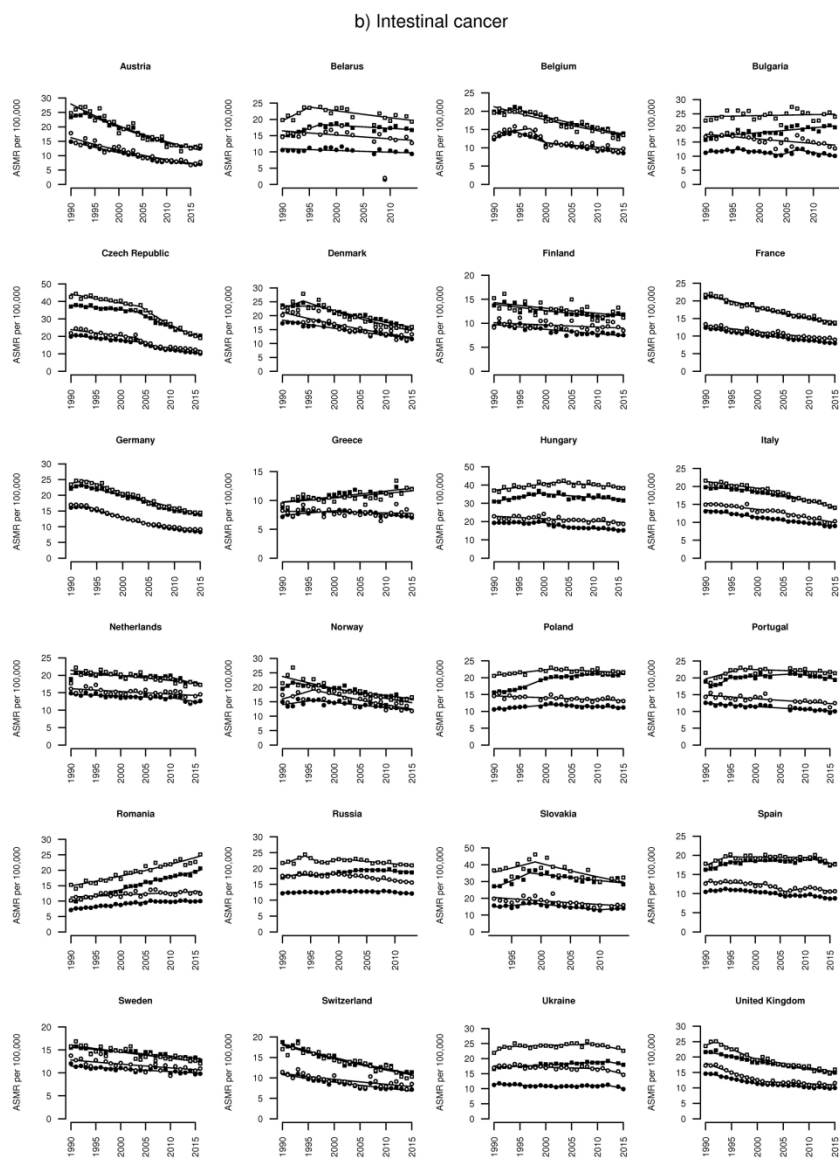


Figure 2. Joinpoint analysis of trends in age-standardized (world population) mortality rates from all neoplasms (a), cancers of intestines (b), lung (c), breast (d) and prostate (e), in 24 selected European countries, from 1990 to 2017 (according to data availability). Filled boxes represent men, all ages; empty boxes men, 35-64 age group; filled circles women, all ages; empty circles women, 35-64 age group.

215x279mm (300 x 300 DPI)

c) Lung cancer

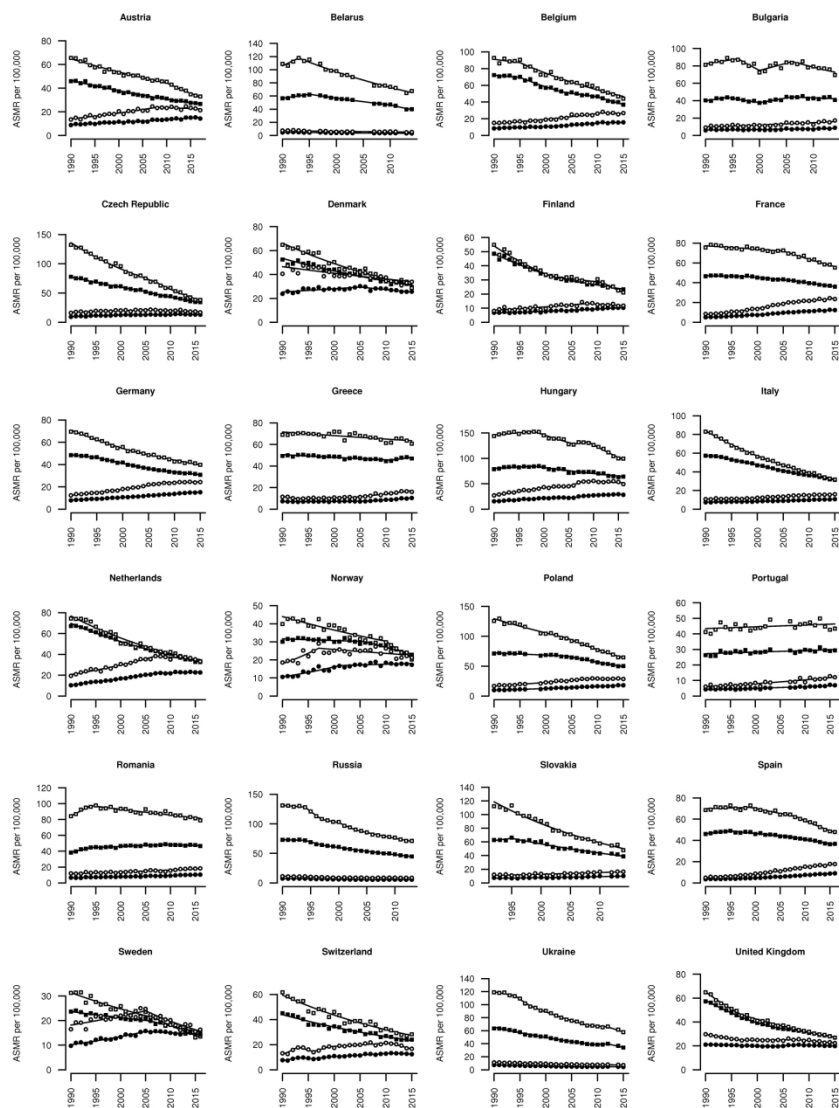


Figure 2. Joinpoint analysis of trends in age-standardized (world population) mortality rates from all neoplasms (a), cancers of intestines (b), lung (c), breast (d) and prostate (e), in 24 selected European countries, from 1990 to 2017 (according to data availability). Filled boxes represent men, all ages; empty boxes men, 35-64 age group; filled circles women, all ages; empty circles women, 35-64 age group.

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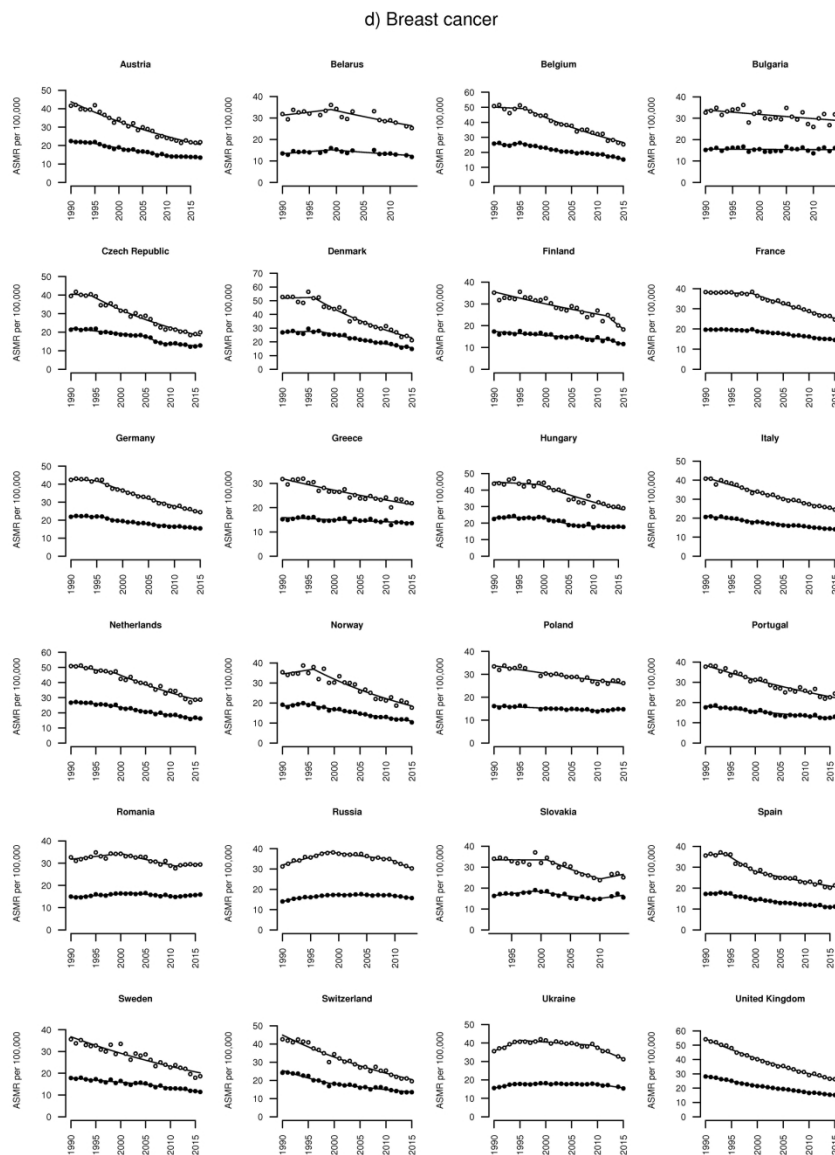


Figure 2. Joinpoint analysis of trends in age-standardized (world population) mortality rates from all neoplasms (a), cancers of intestines (b), lung (c), breast (d) and prostate (e), in 24 selected European countries, from 1990 to 2017 (according to data availability). Filled boxes represent men, all ages; empty boxes men, 35-64 age group; filled circles women, all ages; empty circles women, 35-64 age group.

215x279mm (300 x 300 DPI)

e) Prostate cancer

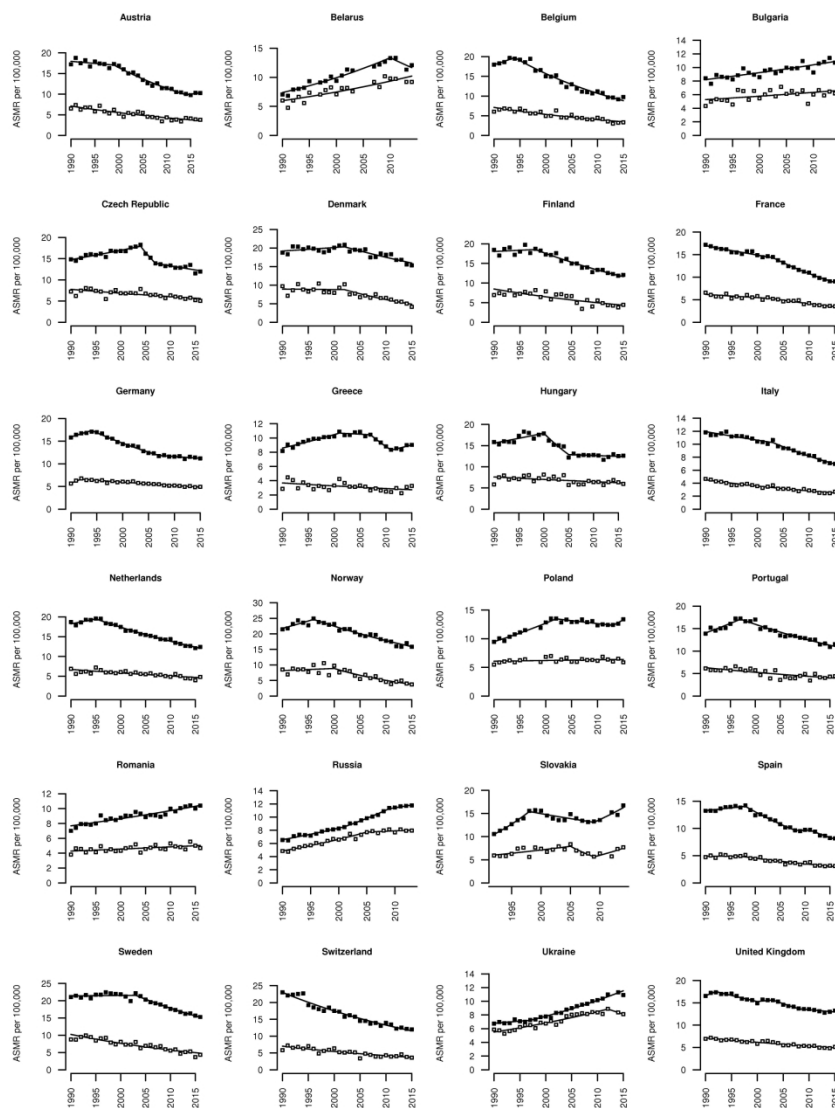


Figure 2. Joinpoint analysis of trends in age-standardized (world population) mortality rates from all neoplasms (a), cancers of intestines (b), lung (c), breast (d) and prostate (e), in 24 selected European countries, from 1990 to 2017 (according to data availability). Filled boxes represent men, all ages; empty boxes men, 35-64 age group; filled circles women, all ages; empty circles women, 35-64 age group.

215x279mm (300 x 300 DPI)